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PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY.

Vol. XIV. 1874. No. 92.

Stated Meeting, January 2d, 1874.

Present, 14 members.

Vice-President, Mr. **Fraley**, in the Chair.

A letter announcing the death of Dr. Carl F. Naumann was received from Dr. Ernst Naumann, dated Dresden, Dec. 4th, 1873.

A letter requesting information was received from Capt. J. Herschel, dated 21 Sumner place, Brompton, London, W.

A letter respecting copies of Mr. Henry Dexter's bust of Agassiz was received, dated Cambridge, Dec. 18th, 1873.

A letter requesting the completion of series of the Transactions and Proceedings was received from the Secretary of the K. K. Geologische Reichsanstalt, dated Vienna, Sept. 20th, 1873.

On motion, the request of the Institute was granted, and the missing parts of the series ordered to be sent.

Letters of envoy were received from the Prince Jablonowski Society at Leipsig, dated Aug. 12th, 1873, and from the Department of the Interior at Washington, dated Dec. 22d, 1873.

Donations for the Library were received from the Academia dei Lincei; the Geological Institute at Vienna; the Prince Jablonowski Society; the German Geological Society; the

Revue Politique; London Nature; the Royal Geographical Society; the Nova Scotian Institute; the Boston N. H. Society; Cambridge Museum; Prof. O. C. Marsh; the Connecticut Academy; Commissioners of Fisheries of New Jersey; Penn Monthly; Medical News; Mr. Geo. W. Childs; the U. S. Chief of Engineers; Librarian of Congress; and Wisconsin Historical Society.

The death of Prof. Carl Naumann, at Leipsig, on the 26th November, 1873, was announced.

Prof. Cope stated that the species figured and described by Prof. O. C. Marsh, in a paper received for the Library to-night, under the name of *Brontotherium ingens*, is the one described by himself under the name of *Symborodon trigonoceras*, in the Synopsis of Extinct Vertebrata of Colorado, issued in October, 1873, by the U. S. Geological Survey of the Territories.

Professor Frazer said: "A few meetings ago I referred to the fact that the white color of the moon by day was due to the fact that the dispersed blue light of the sun just supplied the dispersed blue light of the moon, and I suggested that the solar origin of these otherwise missing rays *might be* demonstrated by choosing the first or third quartering of the moon (when lines joining the sun and earth, and the earth and moon, meet nearly at right angles), and regarding the moon through the Nicols prism. As under these circumstances the solar light would be polarized, a change between white and yellow ought to be perceived. The experiment bore out this hypothesis, although, owing to the perfect reflection from suspended particles of greater size than those which reflect the blue light, the color was not a perfect yellow."

Professor Lesley exhibited a recently executed large manuscript map of a hundred square miles of the surface of Centre, Huntingdon, and Blair Counties, in Middle Pennsylvania, with three vertical sections crossing the district—one along the Little Juniata River; another two miles further east, along Warrior Run.; and a third five miles further east, along Half Moon Run. These sections extend across the Valley of Lower Silurian Limestone, with beds of brown hematite iron-ore, and across the bounding mountains of the Middle Silurian Sandstone, Bald Eagle Mountain on the west, and Tussey Mountain on the east, the great anticlinal upthrow of Bellefont being seen in all three sections at the east foot of Bald Eagle Mountain, the Limestones dipping east away from the fault at a uniform dip of about 54°.

He then explained the theoretical difficulties which have hitherto beset the dynamic questions raised by a phenomenon of this kind, an overthrown and faulted anticlinal; especially the question why a dip of just above 54° should follow one side of the fault for many miles, when the rocks on the other side of the fault stood vertical.

This question he thought he had just succeeded in settling by a discovery which resulted from the construction of a fourth section, which he exhibited, extending from the Bald Eagle Mountain westward to the summit of the Alleghany Mountain, taking in the vertical Middle Silurian rocks, the steeply inclined Upper Silurians, the Devonians dipping regularly less and less (from 28° to 8° where observed at different points along the section), and the almost horizontal Lower Coal Measures at the summit of the Alleghany Mountain.

By a system of co-ordinates, the exact curve of the upthrow on the western side of the Great Fault was displayed, using the observed dips along the line of section as elements of construction. The country west of the dip of 15° was assumed to be in its original condition. East of this point, or of the "hypothetical limit of stability," the steeply upturned strata were supposed to slide upon each other with a shearing motion. The basset edges of the vertical strata must be considered as rising in steps above each other westward at the plane of fault, the slope thus obtained facing the east, many thousand feet in the air, over the Bald Eagle Mountain.

On calculating the angle of this slope, which is not a perfect plane, but a slightly curved surface, it turned out to be an angle of 51° high up, 52° lower down, 53° just over the the mountain, and still steeper where it descended to the present surface of the country, that is, along the line where the vertical rocks are covered by the limestones dipping uniformly about 54°.

It seems impossible to resist the conclusion that this dip of 54° shows that the whole mass of Palæozoic formations on the east, about 20,000 feet thick, rose and rode up the plane formed by the basset edges of the mass upturned vertically on the western side of the fault, and rested thereon at an angle due to the bevel of the western mass, a bevel geometrically determined by the shearing movement among the members of the upcurved western mass.

Mr. Lesley considered the discovery of much importance for structural geology, and that it may prove to be the first real step towards a satisfactory conclusion respecting the slope, or underground (and in the air) angle, of great faults; also proving the negative against a common belief that the great anticlinals of disturbed regions must be reconstructed in air sections as if gaping. It lends great support also to the doctrine of vast erosions, a doctrine taught by Pennsylvanian geologists for many years, and more recently contended for by Jukes, Ramsay, Geikie, and other advanced geologists abroad, on unimpeachable and irresistible evidence.

The report of the Judges and Clerks of the Annual Election was read, by which it appeared that the following officers and members of Council had been elected:

President,

George B. Wood.

Vice-Presidents,

John C. Cresson, Isaac Lea, Frederick Fraley.

Secretaries,

Charles B. Trego, E. Otis Kendall, John L. LeConte,
J. P. Lesley.

Councillors to serve three years,

Isaac Hays, Robert E. Rogers, Henry C. Carey, Robert Bridges.

Curators,

Joseph Carson, Hector Tyndale, Charles M. Cresson.

Treasurer,

Charles B. Trego.

Mr. Lesley was nominated Librarian for the ensuing year.

Pending nominations Nos. 740, 741, 742, 743, 744 were read.

And the meeting was adjourned.

Stated Meeting, January 16th, 1874.

Present, 15 members.

Secretary, Prof. TREGO, in the Chair.

A letter accepting membership was received from Dr. Franz Joseph Lauth, Prof. Accad. Conservator, dated Munich, Blumenstrasse, No. 2413 rechts, Dec. 16th, 1873 (see printed Proceedings).

Letters of envoy were received from the Greenwich Observatory, Dec. 31st, Royal Institution, Liverpool, Dec. 1st, and the Société Nationale des Sciences Naturelles de Cherbourg, Sept., 1873.

On motion, the last-named society was placed on the list of corresponding societies to receive the Proceedings.

Donations for the Library were announced from the Royal Prussian Academy; the Geographical and Anthropological Societies of Paris; Ecole des Mines; Revue Politique; San Fernando Observatory; National Society of Science at Cherbourg; and Mr. Le Jolis; the Society of Physics at Bordeaux;